IoT, Big Data, and Artificial Intelligence in Agriculture and Food Industry

Abstract

Internet of Things (IoT) results in a massive amount of streaming data, often referred to as "big data," which brings new opportunities to monitor agricultural and food processes. Besides sensors, big data from social media is also becoming important for the food industry. In this review, we present an overview of IoT, big data, and artificial intelligence (AI), and their disruptive role in shaping the future of agri-food systems. Following an introduction to the fields of IoT, big data, and AI, we discuss the role of IoT and big data analysis in agriculture (including greenhouse monitoring, intelligent farm machines, and drone-based crop imaging), supply chain modernization, social media (for open innovation and sentiment analysis) in food industry, food quality assessment (using spectral methods and sensor fusion), and finally, food safety (using gene sequencing and blockchain-based digital traceability). A special emphasis is laid on the commercial status of applications and translational research outcomes.